



YALE UNIVERSITY

A. W. WRIGHT NUCLEAR STRUCTURE LABORATORY

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OFFICE OF THE DIRECTOR

September 7, 2005

Dr. Dennis Kovar
Associate Director
Office of Nuclear Physics
U. S. Department of Energy
GTN SC-26
19901 Germantown Road
Germantown, MD 20874

Dr. Robin Staffin
Associate Director
Office of High Energy Physics
U. S. Department of Energy
GTN SC-25
19901 Germantown Road
Germantown, MD 20874

Dr. Michael Turner
Assistant Director
Directorate for
Mathematical & Physical
Sciences
National Science Foundation
4201 Wilson Boulevard
Arlington, VA 22230

Dear Drs. Kovar, Staffin and Turner:

Your letter of March 7, 2005 charged NSAC and HEPAP to establish a Neutrino Scientific Assessment Group (NuSAG) as a joint sub-committee to advise the DOE Offices of Nuclear and High Energy Physics and the NSF Programs of Nuclear Physics and Elementary Particle Physics on issues relating to the U.S. neutrino physics program. This charge was motivated by the growing recognition of the important role played by neutrinos in resolving a number of compelling questions in physics. Following recent Reports by the NRC, NSAC, HEPAP and the APS, the key scientific opportunities in neutrino science, and general guidelines for their pursuit, have been mapped out. Your charge now asks for specific guidelines on particular projects.

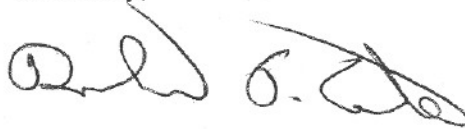
NuSAG was to be set up for a two-year period and will be given various charges in that time frame. Initially three charges were framed; two on θ_{13} and one on neutrinoless double-beta decay. By mutual agreement, the responses to these charges will be sequential, with that on double-beta decay having the most urgent time scale.

NSAC and HEPAP formed a NuSAG sub-committee chaired by Eugene Beier of the University of Pennsylvania and Peter Meyers of Princeton. This sub-committee has now completed its work on the double-beta decay charge and submitted its Report for discussion at an NSAC meeting on August 29, 2005. HEPAP will respond separately to the Report. Here we present the NSAC response. NSAC unanimously accepts the Report and concurs with its findings and recommendations. A copy of the Report is enclosed with this letter.

There are a number of projects addressing the issue of neutrinoless double-beta decay, varying greatly in cost, time scale, technical readiness, and even proof of feasibility. These projects are staged, with smaller initial efforts serving to produce first data and to act as test-beds for larger, more sensitive later efforts. NuSAG evaluated these projects and proposed a two-phase approach of initial experiments and subsequent, more sensitive, ones. Given the variety of methods and approaches, with their inherent uncertainties, NuSAG felt it was premature to identify a single technology that would be optimum for the second phase. Therefore, planning with both phases in mind, NuSAG recommends that the scientific program should initially support at least two efforts. The three that were assigned the highest priority are Cuore, EXO, and Majorana.

NSAC concurs with this assessment and agrees that this multi-pronged approach advocated by NuSAG will place the U.S. in an optimal position to pursue this science in both the near and long term. NSAC recognizes the excitement of this field, the exceptional scientific opportunities that present themselves at this time, and, in particular, the importance of a sensitive search for neutrinoless double-beta decay.

Sincerely,

A handwritten signature in dark ink, appearing to read 'R. Casten', written over a horizontal line.

Richard F. Casten
Chair, NSAC

cc: Joseph Dehmer
Brad Keister